

UC-NRLF



B 4 179 263

ERKELEY LIBRARY

K F C
455
A432
A2
1916
DOCS



XB
7
19094

61157879

Railroad Commission of the State of California.

REGULATIONS GOVERNING THE PROTECTION AND GUARDING OF
MOVING MACHINERY, POWER TRANSMISSION AND OTHER
MECHANICAL EQUIPMENT, LADDERS AND STAIRWAYS, PLAT-
FORMS, PASSAGES AND OTHER FACILITIES.

Issued Under Authority of Section 42, Public Utilities Act.

Approved May 8, 1916. Effective June 1, 1916.

It is hereby ordered by the Railroad Commission of the State of California that the safety regulations hereinafter prescribed for the protection and guarding of moving machinery, power transmission and other mechanical equipment, ladders and stairways, platforms, doors, windows and floor openings, hoistways and conveyors and other equipment and facilities of like nature, shall hereafter be observed by public utilities in this State unless otherwise authorized or directed by this Commission.

1. Gears.

(a) All gears, where exposed to contact, must be entirely enclosed, or equipped with side flanges extending inward beyond the root of the teeth.

(b) All spoke gears and open web gears, which are over eighteen (18) inches in diameter, where exposed to contact, must be entirely enclosed. On large gears, such as those on heavy shears and punches, the guard must be such as to cover them to a height of seven (7) feet above the floor.

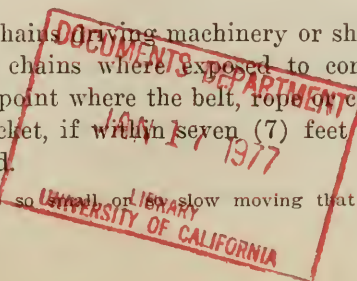
(c) Where it is clearly impracticable to cover gears, as described above, a boxed frame of metal or wood must be installed, completely shutting off the machinery gears.

(d) All gear guards must be kept in place while the machinery is in operation.

2. Belts.

(a) All belts, ropes or chains on moving machinery or shafting, and all secondary belts, ropes or chains where exposed to contact, must be guarded. In all cases the point where the belt, rope or chain runs onto the pulley, sheave or sprocket, if within seven (7) feet of the floor or platform, must be guarded.

Exception.—Belts which are so small or so slow moving that they are not in any way a source of danger.



(b) All horizontal belts, ropes or chains driving machinery or shafting seven (7) feet or less above the floor or platform, where exposed to contact, must be guarded. All overhead belts six (6) inches or more in width and over seven (7) feet from floor or platform, must be guarded underneath and on sides, unless so guarded that persons can not pass under them. All chain or rope drives over seven (7) feet from floor or platform must be guarded in like manner to belts over six (6) inches in width. In all cases the guard should cover the outer faces of the two pulleys or sheaves and extend upward to such a point, and be attached in such a way, that in case the belt, chain or rope breaks, the guard will withstand the whipping force.

(c) Vertical and inclined belts must be substantially guarded as follows:

If the guard must be less than fifteen (15) inches from the belt, with a complete enclosure of wood or metal to a height of six (6) feet above the floor.

If the guard can be placed with at least fifteen (15) inches clearance from the belt, with a two-rail railing at least three and one-half ($3\frac{1}{2}$) feet high.

NOTE.—In rooms, or parts of rooms, used exclusively for transmission machinery, such as the ground floor of sawmills and the basements of paper mills or flour mills, it has been found practical to define certain passageways for the use of oilers and millwrights, and to guard the pulleys, belts and shafts along these passageways.

3. Pulleys.

(a) Pulleys must be so placed as to allow the width of the belt between two pulleys, or between the pulley and the shaft hanger or bearing, or a hook must be provided, or a guard placed adjacent to the pulley to prevent the belt from leaving the pulley.

(b) All machines must be equipped with a loose pulley or a clutch or some other adequate means of stopping the machine quickly.

(c) All pulleys or parts of pulleys within seven (7) feet of the floor must be guarded, if exposed to contact.

4. Clutches.

(a) All clutches must be completely guarded where exposed.

NOTE.—Practically all clutches have protruding parts which make them as dangerous as projecting set screws on shafting.

5. Belt Shifters.

(a) A permanent belt shifter must be provided for all loose pulleys, and must be located within easy reach of the operator. The construction of belt shifters must be such as to make it impossible for the belt to creep back onto the tight pulley. All belt shifters must be equipped with a lock or some other device to prevent accidental shifting.

6. Shafting.

(a) All transmission shafting, either horizontal or vertical, in workrooms or in passageways leading to workrooms, and located within seven (7) feet of the floor or platform, must be guarded.

(b) Dead ends of shafts less than seven (7) feet from the floor or platform, or wherever exposed to contact, must be guarded.

7. Set Screws.

(a) All projecting set screws on moving parts must be removed, countersunk or protected by a solid collar, or a headless set screw must be used. No part of the set screw must project above the surface.

8. Sprockets.

(a) All sprockets must be guarded, if exposed.

9. Flywheels.

(This applies to flywheels of machines and not to flywheels of engines, which must be guarded in accordance with Safety Orders for Stationary Engines.)

All parts of flywheels with spokes, which are seven (7) feet or less above the floor, must be guarded as follows:

(a) If guard is at least fifteen (15) inches in the clear from both sides and face of wheel, a fence may be used at least three and one-half ($3\frac{1}{2}$) feet high, to be either solid or of substantially supported wire mesh or close slats.

(b) If guard is less than fifteen (15) inches in the clear from both sides and face of wheel, a fence must be provided at least five (5) feet high, the fencing to be either solid or of substantially supported wire mesh or close slats.

Exception.—Flywheels which are so small or so slow moving that they are not in any way a source of danger.

(c) All flywheel pits must be surrounded with a toe-board not less than six (6) inches in height.

10. Grinding Wheels.

(a) Where practicable, grinding wheels must be provided with a hooded guard of sufficient strength to withstand the shock of a bursting wheel. This guard must be adjusted close to the wheel and extend forward over the top of the wheel to a point at least thirty (30) degrees beyond a vertical line drawn through the center of the wheel.

(b) Arbor ends must be guarded.

(c) Speed of wheels must not exceed the speed guaranteed by the manufacturer.

(d) Where practicable, grinding wheels must be provided with safety flanges.

NOTE.—Wheels should be handled with the greatest care in unpacking, storing, delivering, etc., and should never be left standing on the ground or wet places. Great care should be used in mounting wheels; never force a wheel on the arbor. It is advisable to use relieved flanges, compressible washers between wheel and flange, and to obtain a perfect bearing at the outer edge of the flange. Vibration should be avoided at all times.

TABLE OF GRINDING WHEEL SPEEDS.

Diameter of wheel in inches	Revolutions per minute for surface speed of 4,000 feet	Revolutions per minute for surface speed of 5,000 feet	Revolutions per minute for surface speed of 6,000 feet
1	15,279	19,099	22,918
2	7,639	9,549	11,459
3	5,093	6,366	7,639
4	3,820	4,775	5,730
5	3,056	3,820	4,584
6	2,546	3,183	3,820
7	2,183	2,728	3,274
8	1,910	2,387	2,865
10	1,528	1,910	2,292
12	1,273	1,592	1,910
14	1,091	1,364	1,637
16	955	1,194	1,432
18	849	1,061	1,273
20	764	955	1,146
22	694	868	1,042
24	637	796	955
26	586	733	879
28	546	683	819
30	509	637	764
32	477	596	716
34	449	561	674
36	424	531	637

The revolutions per minute at which wheels are run is dependent on conditions, and in actual practice wheels are run at surface speeds of from 4,000 to 6,000 feet per minute up to as high as 7,500. It is recommended that for most grinding operations surface speeds should not exceed 6,000 feet. As a wheel wears down the speed is increased to maintain the same surface speed, and great care must be exercised when a new wheel is provided to avoid overspeeding.

11. Ladders.

(a) All movable ladders (except substantial stepladders) must be provided with either sharp points at the foot or wide, rough surface feet, or other effective means to prevent slipping. Ladders for use in oiling overhead shafting, where necessary to rest same on the shafting, must be arranged to hook over the shafting.

12. Stairways.

All stairways must be equipped with handrails, the top of which shall be 30 inches vertically from the nose of the tread, as follows:

(a) Where the stairway is not built next to a wall or partition, rails must be placed on both sides.

(b) If stairway is closed on both sides, at least one handrail must be provided.

(c) If width is greater than four (4) feet, rails must be provided on each side.

(d) If width is eight feet or greater, rails must be provided on each side and in center of stairway, except in cases where in the judgment of the Industrial Accident Commission a center railing would be impracticable.

(e) All stairways must be properly lighted either by natural or artificial light.

NOTE.—Stairways should not be built at a sharper angle than fifty (50) degrees. For sharper angles, ladders should be used instead.

13. Platforms and Runways.

(a) All elevated walks, runways or platforms, except on loading or unloading sides of platforms, if four (4) feet or more from the floor level, must be provided with a two-rail railing not less than three and one-half ($3\frac{1}{2}$) feet high. If height exceeds six (6) feet above floor level, a toe-board must be provided to prevent material from rolling or falling off.

(b) Wherever permanent elevated platforms are in frequent use they must be equipped with a permanent stairway or stationary ladder.

14. Swinging Doors—Windows.

(a) All swinging doors in stairways and all doors swinging both ways in general passageways must be provided with windows. One window must be provided for each section of double swinging doors. Both sides of the doors must be provided with adequate light, either natural or artificial, during the hours of active operation in the department in which said swinging doors are located. The windows must be kept free from dirt or other obstruction to the vision.

NOTE.—In order to accommodate boys or girls, the bottom of the windows should not be more than forty-eight inches from the floor. The size of the window which is recommended should be not less than eight inches by twenty-four inches. Guards should be placed over the window to protect the glass from being broken by protruding parts on trucks, etc.

15. Passages—Keep Clear.

(a) All passageways and gangways must be kept clear and in good repair and free from nails or obstructions over which persons may stumble and fall.

16. Keys and Keyseats.

(a) All projecting keys in shafting, where exposed, must be cut off or guarded, and all keyseats in ends of shafts, where exposed, must be filled flush or guarded.

Exception.—When in the opinion of the Industrial Accident Commission it is impossible to fill or guard the keyseats of machines without interfering with the operation of the machine.

17. Floor Openings.

(This applies to any floor opening.)

(a) All floor openings must be guarded with a railing not less than three and one-half ($3\frac{1}{2}$) feet high, having a toe-board not less than six (6) inches high, and an additional railing midway between the toe-board and top rail, railings to be constructed in a safe and substantial manner, of either pipe, metal work or wood. One or more sides may be on hinges, or if hinges are impracticable, sockets may be used.

(b) All chutes or stairway openings which can not be guarded as required in (a) must be provided with a hinged cover, which, when open, must be guarded in a safe and substantial manner.

18. Hoistways.

(a) Any platform outside of a building, or any opening giving access to a yard arm, used for the purpose of hoisting or lowering material by tackle or other means from one level to another (not including platform elevator) must be guarded according to standards for floor openings.

19. Conveyors.

(a) All conveyors shall, where exposed to contact, be guarded. If conveyor runs in a trough within three (3) feet above a floor level, or just below a floor level, it shall be either completely covered with a substantial lid, or enclosed by a railing, and necessary crossings provided and guarded.

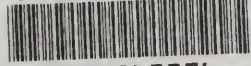
This order shall be effective, as to all equipment and facilities to be hereafter installed, on and after June 1, 1916, and as to all equipment and facilities heretofore installed this order shall be effective on and after September 1, 1916.

RAILROAD COMMISSION OF THE STATE
OF CALIFORNIA,

By CHARLES R. DETRICK, *Secretary.*



U.C. BERKELEY LIBRARIES



C025242276

